

provider to the DDS. In such a case, for example, a module of the software of the content provider might send a message to the scheduling intelligence module 1217 including the metadata, a specified "unique number", and a request that the included metadata be saved on the scheduling intelligence module's associated store with reference to the specified unique number. In some embodiments, this message could be sent using SOAP. In response, the scheduling intelligence module could appropriately store the sent metadata.

In cases where there is no VPN connection between the content provider and the DDS, additional steps might be necessary. For example, it might be necessary to configure a firewall 801 to allow entry of the message directed to the scheduling intelligence module. In such a case there might be a gatekeeper module 801 which would be capable of configuring the firewall to allow entry of the message. Accordingly, prior to sending the message specifying the metadata, a module of content provider software might send to the gatekeeper object a message requesting passage of a second message to the scheduling intelligence module. In some embodiments, the first message may further include an encrypted or unencrypted password and/or identification number relating to the content provider.

In one embodiment, in response to the message the gatekeeper module could configure the firewall to allow entry, wait for a message from the scheduling intelligence module indicating that the message including metadata had been successfully received, and then reconfigure the firewall to disallow further entry. Configuration of the firewall could be done, for example, by having the gatekeeper object make use of the Unix IPFW command or equivalents. In embodiments where the message to the gatekeeper included a password and/or identification number, the gatekeeper would verify credentials before altering the firewall.

As noted above, blocks allocated for distributing content are initially marked as "reserved" in the datastore of the scheduling intelligence module. As alluded to above, upon

receipt of the metadata, the scheduling intelligence module alters its datastore so as to correlate the received metadata with the appropriate blocks.

In certain embodiments of the present invention, service announcements may periodically be sent to user terminals. Such service announcements may include the metadata for one or more distributions along with their corresponding unique identifiers. As will be described in detail later, such service announcements may be used for purposes including content filtering. In certain embodiments, the service announcements could be sent using the SAP (Service Announcement Protocol) and/or SDP (Service Description Protocol) protocols.

According to embodiments of the invention the scheduling intelligence module may provide for the transmission of a service announcement by sending a message to an appropriate caster module as indicated by the metadata to be sent via the service announcement. The message may include metadata for a particular distribution along with the corresponding unique identifier and a request that these items be “cast”. The appropriate caster module will be a global caster module if the metadata indicates global distribution. On the other hand, if the metadata specifies distribution to a specific network area, the appropriate caster module will be the caster module corresponding to the specified area. The details of casting modules will be described in detail later.

Like metadata, non-live content must be uploaded by the content provider. For live media, such as a live video stream, the upload will occur approximately at the time broadcast over the wireless link is to occur. On the other hand, for non-live content upload may occur before broadcast time. Accordingly, for non-live content, the scheduling intelligence module determines the time at which content upload from the content provider will occur. The determination takes into account factors such as bandwidth and storage availabilities throughout the DDS at various times. In certain embodiments of the invention a content provider would be

able to suggest an upload time to the scheduling intelligence module. The scheduling intelligence module would take this suggestion as an additional factor to consider during its determination of the upload time.

For example, in the case of non-live content the scheduling intelligence module may cause a message such as:

“Upload of content for distribution #123456 will occur  
Aug. 15th 2002 @ 11:12:00. Failure to meet this deadline  
may result in reassignment of bandwidth”

to be displayed upon the user interface of the content provider software. The content provider could take this as an indication that the specified non-live content would need to be ready for upload before that the specified point in time, and that the scheduling blocks designated for the content might be revoked if the deadline was not met. In certain embodiments, the content provider software would make note of the upload time.

In some embodiments, the content provider could make content ready for upload by choosing “select non-live content for future upload” from a menu of the content provider software. The content provider software could respond by asking the content provider for the corresponding unique identifier. After the content provider provided it, the content provider software could present the content provider with a file browser from which to select the file or files for upload. In some embodiments the content provider software could move these files to a specific storage location, such as an upload buffer associated with the content provider software. In alternate embodiments the content provider software could leave the files where they were, perhaps taking additional steps to make sure that the files would remain in that location and not be modified. For example, the content provider software could set the attributes of the files to prevent movement or other change, perhaps using the Unix command CHMOD, the Unix command CHFLAGS, or equivalents.